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09/945,367	08/31/2001	Kevin Hunter	500893.01	2110

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EXAMINER
AMINI, JAVID A

ART UNIT	PAPER NUMBER
2672	

DATE MAILED: 08/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>05 April 2005</u>.

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☐ Claim(s) _____ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-11 and 13-36</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage

        application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/9/04;4/5/05</u>.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in

37 CFR 1.17(e), was filed in this application after final rejection. Since this application is

eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e)

has been timely paid, the finality of the previous Office action has been withdrawn pursuant to

37 CFR 1.114. Applicant's submission filed on 04/05/2005 has been entered.

Response to Arguments

Applicant's arguments with respect to claims 1-11 and 13-36 have been considered but

are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

Claims 1-11, 13-36 rejected under 35 U.S.C. 103(a) as being unpatentable over Griffin,

and further in view of Vijayakumar et al. hereinafter refers as V-Kumar.

Claim 1.

Griffin's invention relates to graphics rendering systems that generate pixel fragments to perform

anti-aliasing. The claim language of "a method for calculating values for pixels of an image of an

environment represented by geometric primitives that are defined by geometric data" is similar

to Griffin's background at col. 2, lines 1-4 discloses that in the context of 3-D graphics, the

rendering process includes transforming the graphical models in a scene, and rasterizing the

geometric primitives in the models to generate pixel data. The claim invention claims, "Selecting

a first transformed primitive from the transformed primitives in the second coordinate space".

Griffin similarly discloses the model's local coordinates as Applicant claims "a first transformed

primitive" and world coordinates is similar to Applicant's claim invention as "the second

coordinate space". Griffin at col. 2, lines 24-31 discloses the rendering process typically begins

by transforming the vertices of the geometric primitives to prepare the model data for the

rasterizing step. While the specific details of the transformation phase vary, a few examples will

illustrate the process. The modeling transform, in some systems, is used to convert the vertices

of a model from the model's local coordinates to world coordinates.

Applicant claims "without shifting any of the other transformed primitives, shifting the first

transformed primitive in the second coordinate space by a first sub-space by a first sub-pixel

offset from a first pixel position to a first sub-pixel position; rendering the first shifted primitive

at the first sub-pixel position to generate values for a first set of pixels for the first shifted

primitive" Examiner's interpretation: the shifting process is just involved the first transformed

primitive, and the following claim languages is very broad "without shifting any of the other

transformed primitives". It does not provide any type of specific information. Griffin at cols. 34-

35, lines 64-67; 1-15 respectively, teaches the pixel coverage mask is computed by determining a

coverage mask value for each edge and bitwise ANDing them together. The computation of the

coverage mask is a two-step process. The first step is to determine how many of the subpixel

bits in the coverage mask are to be turned on, and the second step is to determine which specific

bits are to be enabled. The first step uses the area of the pixel, which is covered by the edge to determine how many of the coverage mask bits, is to be switched on. This area is computed by a table lookup indexed by the edge slope and distance from the pixel center. The second step uses the edge slope to determine the order in which the sample bits are to be switched on. The set of bit orders is stored in a pre-computed tabled called the `Coverage Order` table. Each coverage order table entry consists of a specific ordering of the sample bits, which is correct for a range of slope values. The edge slope is tested against the set of slope ranges, and the index associated with the range containing this slope value is used as the index into the coverage order table. Griffin is silence about rendering the first shifted primitive at the first sub-pixel position, however V-Kumar at col. 9, lines 12-25 teaches the pixel 1508 is super-sampled at a predefined resolution or sampling grid pattern (e.g., fig. 3 or 4). The Z values at the sub-pixel locations defined in pixel 1508 are stored in the fine Z buffer 210, and are used subsequently for Z comparison at sub-pixel resolution further down the graphics pipeline, The computed texture values involve texture coordinate generation and texture filtering. The texture-filtered values are stored in the fine color buffer 212 and the sub-pixel colors are blended to obtain the final pixel color. Applicant at the following claim invention claims similarly to the pervious step of the claim (i.e. claim 1, lines 8-10), in this step claims for the second sub-pixel offset. Examiner's interpretation: a pixel can be divided into four sub-pixels (e.g. first sub-pixel, second sub-pixel, third sub-pixel and forth sub-pixel), as V-Kumar in figs. 3-4 illustrates the sub-pixels. The claim languages are: "shifting the first transformed primitive in the second coordinate space by a second sub-pixel offset from the first pixel position to a second sub-pixel position". The following claim invention is repeated similarly as claim 1, lines 11-12 "rendering the first shifted

primitive at the second sub-pixel position to generate values for a second set of pixels for the

first shifted primitive". It would have been obvious for a person skill in the art to capture the

concept of transferring data values from one coordinate to another coordinate, e.g. V-Kumar in

fig. 3 transfers a pixel 300 into four subpixels 302, 304, 306 and 308, meaning transferring a

pixel coordinate into subpixels' coordinates and similarly the subpixels' values. The last step of

the claim invention discloses "combining the values for the first and second sets of pixels for the

first transformed primitive to determine values for a resultant set of pixels for the first

transformed primitive that are included in the pixels of the image". Griffin at cols. 36-37, lines

62-67; 1-4 respectively teaches combining the coverage masks; the merged head coverage mask

is checked to determine whether it represents a fully covered pixel (984). If the merged head

coverage mask is not full, then processing continues with the next instance of pixel data (966). If

the merged head coverage mask is full, the merged head coverage mask has resulted in full pixel

coverage. Therefore, the storage used for the head fragment is freed (986), and the head

fragment color, Z, and coverage mask are replaced with the new fragment color, Z, and coverage

mask (976). Thus, it would have been obvious to one of ordinary skill in the art at the time of the

invention to substitute applicant 's described structure i.e. related generally to the field of

sampled imagery, and more particularly, to systems and methods for generating antialiased,

sampled images; by combining the super sampling method of V-Kumar into Griffin's invention

to render geometric primitives of objects and to create pixel data including pixel fragments

representing partially covered pixels.

Re claims 2, 15-17, 19, and 25-26, Griffin at col. 3, lines 34-46 discloses that if the newly

generated pixel data is closer to the viewpoint, it is written over the current values in the Z-buffer

for the corresponding pixel location. If not, it is disregarded.

Re claims 3, 20, 27, and 34, Griffin at col. 3, lines 34-46 discloses that if the newly generated

pixel data is closer to the viewpoint, it is written over the current values in the Z-buffer for the

corresponding pixel location.

Re claims 4 and 30, V-Kumar in fig. 11 broadly illustrates the limitation.

Re claims 5-6 and 31-32, V-Kumar in fig. 1 block 102 illustrates the functions of the polygon.

setup stage include receiving 3D geometry elements (e.g., triangles or other graphic primitives)

and processing the data describing the size, shape, position and other relevant characteristics of

the graphics primitives.

Re claims 7, 11-10, and 23, See rejection of claim 1, lines 13-14.

Re claims 8, 13, 21, 28, and 35, Griffin in fig. 21 illustrates block 1224 a pixel with subpixels

combine the pixel data (subpixels) value by alpha and color accumulators (ACA) (1226), each

ACA dedicated to one subpixel region of the pixel.

Re claims 9, 14, 22, 29, and 36, Griffin in fig. 21 illustrates block 1224 a pixel with subpixels

combine the pixel data (subpixels) value by alpha and color accumulators (ACA) (1226), each

ACA dedicated to one subpixel region of the pixel.

Re claims 10, 18, 24, and 33, the Limitation of claims 10, 18, 24, and 33 are identical to claim 1

above. Therefore, claims 10, 18, 24, and 33 are treated with respect to grounds as set forth for

claim 1 above.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Javid A. Amini whose telephone number is 571-272-7654. The

examiner can normally be reached on 8-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Michael Razavi can be reached on 571-272-7664. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JEFFERY BRIER
PRIMARY EXAMINER

Javid A Amini
Examiner
Art Unit 2672

Javid Amini